

extending throughout the course of the right sciatic nerve and the lumbar region. He was treated for sciatica, and massage and electricity were given, likewise a generous amount of medicine and many baths. After ten weeks of suffering he applied for treatment at the Mount Sinai Dispensary; he then complained of pain in the right gluteal region and in the sacrum. A well-marked list to the spine was noticeable, muscular spasm was decided and clinically he presented the signs of a lumbar spondylarthritis. A short time after applying a jacket with a thigh ring all symptoms were completely relieved. Five weeks later the jacket was removed temporarily for the purpose of taking a roentgenogram and his trouble returned in a mild form. The spine straightened appreciably. Another jacket was applied, with complete relief. The patient had lost seven pounds, presented a flattening of the lumbar curve, and a left dorsal and a right lumbar deviation. There was marked spasm of the lumbar spinal musculature. The motions of the lumbar sector of the spine were *nil* and the first of these vertebrae were very tender over their spinous processes. Knee-jerks were lively; no ankle-clonus; no Babinsky; no evidence of psoas irritation. Diagnosis: Lumbo-sacral arthritis with spinal deviation. Roentgen-ray findings: A slight flattening out as well as a slight lipping of the surfaces of the bodies of the last two vertebrae. He has never been sick since and has worked steadily (April, 1921).

OBSTRUCTION OF THE SUPERIOR VENA CAVA BY PRIMARY CARCINOMA OF THE LUNG.

By HAROLD W. DANA, M.D., F.A.C.P.,

BOSTON

PATHOLOGICAL REPORT

By RUSTIN MCINTOSH, M.D.,

NEW YORK.

IN the years since a case of obstruction of the superior cava was first reported by Corvisart, in 1806, there have been recorded 300 cases of this condition, although many of the reports do not permit of a definite conclusion as to the primary etiology.

First collected by Oulmont¹ in 1856, Fischer² in 1901 tabulated 253 cases, to which list Hume added 12 cases from the literature, in Osler's³ report of 2 cases of his own in 1903. The remaining 17

¹ Soc. méd. d'observation, 1856, t. 3, 463.

² Inaug. Dissertation, Halle, n. S., 1904.

³ Bull. Johns Hopkins Hosp., 1903, 14, 169.

cases in Hume's collection, which comprises 29 in all, had been noted in Fischer's list. Rauth⁴ includes all of these, except Fischer's own case, in his tabulation of 277 cases in 1911, but as 1 of Rauth's cases had been reported twice the list then stood at 277 cases. In the past ten years more or less satisfactory evidence of the etiological factor has been obtained in 23 other cases of obstruction of the superior cava, reported by seventeen authors.

In the series noted, Fischer was able, out of 20 cases described as being due to primary carcinoma of the lung, to find definite proof, through reports of the microscopic findings, of caval obstruction due to primary carcinoma of the lung in only 4 of the 20 cases. He also verified 13 reports of cava obstructed by primary carcinoma of the bronchi and added 1 case of his own. All but 2 of these cases involved the right lung or the right bronchus. Fischer's own case involved both primary bronchi, the process being more extensive in the left bronchus. Which particular case report from the literature was accepted by Fischer as one of caval obstruction due to carcinoma primary in the left lung I have not been able to identify from the 252 references that Fischer gives. Rauth added to these figures 2 cases of his own of obstruction of the cava as the result of primary carcinoma of the lung, and a case of "cancer" of the lung is included in Hume's collection. This case reported by Barth,⁵ in 1853, while listed by Hume as due to primary carcinoma of the lung, was described by Barth as probably primary in the kidneys, and while called by Barth cancer, was more probably a sarcoma or an adrenal tumor. The "cancerous masses" involved both lungs in this case, especially the left. This case can be omitted as not being one of primary carcinoma of the lungs from the original record. Rauth's 2 cases were both due to carcinoma of the right lung.

We have here, then, reports of the interference with the circulation in the superior cava by "primary carcinoma" of the lung in 23 instances, verified as carcinoma in only 6 of these 23; by carcinoma primary in the bronchi in 14 observations. In only 2 of these 37 was the seat of the malignant process in the left lung or bronchus. This is an interesting fact which cannot be a mere coincidence.

Rauth gives as his opinion that this may be due to the right bronchus being the wider and straighter, the right lung being thus more exposed to injury than the left.

Another explanation, it seems to me, may be in the anatomical relation between the cava and the right lung. Certainly, neoplasm of the left lung is not so uncommon as these figures would seem to indicate. While it is a rare condition it so happens that I have seen 2 cases of malignant involvement of the left lung within

⁴ Inaug. Dissertation, Univ. zu Giessen, Borna-Leipzig, Rob't. Noske, 1911.

⁵ Bull. de la soc. anatom. de Paris, 1853, 28, 4.

the past two months, in neither of which was there any interference with the cava. It is my opinion that neoplasm of the left pleural contents usually causes death of the patient from cachexia, from toxemia affecting the heart, from gross interference with the action of the heart or with respiration before the tumor mass has reached the situation of the superior cava; that, on the other hand, tumors of whatever nature involving the right lung or bronchus, or the anterior mediastinum, primarily will soon upset the circulation in the great veins. In support of this theory is the statement of Fischer that most malignant tumors produce caval obstruction not merely by compression but usually by an actual invasion of the vein. Out of the 18 cases to be certainly identified as primary carcinoma of the lung or the bronchus, Fischer found an invasion of the wall of the cava by the tumor in 10 instances.

The case here reported was one in which the obstruction of the caval flow was recognized early and in which autopsy showed that the obstruction was due to a malignant adenoma apparently taking its origin from the bronchioles and involving primarily the left lung.

Clinically, what impressed me most in this case was the absence of edema of the patient's body below the waist. In spite of puffy face, neck and chest there was no ascites demonstrable and his legs were thin. This discrepancy between the upper and the lower halves of the body has apparently surprised many other observers. Comby,⁶ Favre,⁷ Achard⁸ and Haumeder⁹ all express their astonishment over this feature of the disease.

It is of interest to note that the three reports by Comby represent only one patient who survived more than fifteen years after his cava became obliterated and who died of general paresis.

Checking the physical findings during life with the autopsy protocol is always instructive. Some things that we found of interest were:

1. That my note on December 23 for absolute heart dulness corresponds quite closely with the situation of the tumor mass.
2. That the situation in which I heard the heart sounds best, on the same date (fifth right space near the right nipple), does not correspond at all with the position of the heart, which was pushed downward, backward and to the left.
3. That the presence of fluid in the left pleural cavity did not interfere with the signs of consolidation of the left lung.
4. That the signs of consolidation were about equally marked over both lobes on the left, probably from compression of the more or less normal lower lobe by the tumor.

⁶ Bull. et mém. de la soc. méd. des Hôp. de Paris, January 8, 1892: *Journal* cited December 15, 1893; Vigouroux et Collet, *journal* cited, 1906, 23, 3e s., 137.

⁷ Rev. méd. de la Suisse Rom., Geneva, 1918, 38, 97.

⁸ Bull. et mém. de la soc. méd. des Hôp. de Paris, 1896, p. 717.

⁹ Wiener med. Wchnschr., 1919, 69, 1622.

In the following clinical report the notes initialed "O'H." represent the findings of the house physician, Dr. O'Hara.

We wish to express our indebtedness to Dr. F. B. Mallory for the preparation of the photomicrographs and for his confirmation of the microscopic diagnosis here set forth, thereby adding much to the value of this paper.



FIG. 1.—Showing edema of the face and the neck, also dilatation of the veins of the trunk and the right arm.

Clinical History. P. B., aged twenty-nine years, white; single. Birthplace, Germany. Admitted December 21, 1919.

Chief Complaint: Shortness of breath.

Family History: Father living and well in Germany; mother died of heart disease; two brothers and one sister living and well in Germany. No family disease known.

Past History: Up to twenty-one years of age he had been in very good health, with the exception of occasional "stomach trouble," which was always relieved by taking sodium bicarbonate. At the age of twenty-one he had scarlet fever and diphtheria simultaneously. Since then he has been in good health up to the present illness. No operations.

Head: No headaches; no dizziness. Eyes, ears, nose and throat negative.

Cardio-respiratory: No dyspnea; no palpitation; no edema; no cough except short colds in winter season; no pains.

Gastro-intestinal: Appetite good; bowels irregular at times; several attacks of indigestion. Had piles fourteen years ago, which disappeared and now appear with the present illness. Some pain with attacks of indigestion and regurgitation of sour material. 149

Genito-urinary: Denies venereal; no nocturia; no polyuria; no dysuria; no burning micturition.

Neuro-muscular: No shooting pains; no ataxia; sound sleeper.

Extremities: No lameness; no edema up to the present illness.

Habits: Drank beer very moderately up to four years ago. No other alcoholic beverages. Smokes two or three cigars daily and very occasionally a cigarette. No drugs.

Occupation: Cook.

Present Illness: Felt well until October 20, 1919, when he began to feel a little weak, but continued to work. The following day he had a sharp pain which began in the left shoulder, traveled down the left arm and then over the left chest. At this time he was not dyspneic nor did he have palpitation. On October 28 he went to his doctor, who said his condition might be serious and advised a roentgen-ray examination. Doctor told him the roentgen-ray showed enlarged heart and that he must not work for a year. During the following four weeks the patient rested, but not in bed. Gradually he became dyspneic and his legs began to swell. About three weeks ago he developed a cough which lasted about two weeks, during which time there were three days on which he spat up a little blood. Dyspnea and edema have steadily increased, slightly subsiding during the night, only to be progressively worse the following day. For the past twenty days he has not been able to lie on the right side because of pain and inability to breathe.

Physical Examination: Patient is a man fairly developed and nourished, lying on his left side in bed and breathing rapidly, with an expression of discomfort on his face. He is rational and quiet; cyanosed.

Head: No exostoses; considerable degree of edema about the face, the neck and the lower jaw. Puffiness of both eyelids.

Neck: No rigidity; some stiffness due to edema. No abnormal pulsations felt.

Chest: Well-formed, equal expansion; considerable edema; veins prominent over the chest.

Lungs: Dulness throughout; few high-pitched rales heard over both apices; posteriorly breath sounds decreased throughout. Tactile fremitus diminished over both lungs, more so on the left, posteriorly.

Heart: Action rapid; area not made out on account of generalized dullness and edema. Heart sounds distant; no murmurs made out.

Abdomen: Somewhat edematous; liver and other organs not palpated, due to edema. Veins considerably enlarged and prominent throughout. No tenderness.

Extremities: Arms considerably swollen; legs not so marked as arms, chest and neck.

December 23 (H. W. D.): Marked cyanosis, especially of the left chest and the left upper back. Marked dyspnea. Edema of the face, neck, eyelids and precordia very marked. Legs small. Visible pulsation in epigastrium. Pulse moderately rapid, good volume and tension. Cardiac impulse best felt below the ensiform.

Heart Dulness: { absolute, 6.5 cm. to the right: 13 cm. to the
left of midsternum.
relative, 14.5 cm. to the right of midsternum:
limit of dulness not made out on the left.

Flatness over the entire precordia. Cardiac impulse well felt in neighborhood of and below the right nipple. Heart sounds best heard in the fifth right space, 13 cm. to the right of the midsternum; well heard in the right back near the angle of the scapula. Marked dilatation and distention of the superficial veins from the midline to the right as far as the midscapular line in the right back and from the level of the pubis to the level of the clavicle in front and the spine of the scapula behind.

Lungs: Dulness to flatness in the left axilla; area of crepitation and bronchial breathing at left base behind.

Examination of Urine: Negative on two examinations.

December 24 (O'H.). The edema is pretty well limited to the head and neck. The blood is going from above downward in the superficial vessels. Signs of fluid in the left chest still present. They seem to have varied from time to time quite a little. Yesterday 1700 cc, removed slowly of clear amber fluid, very evidently a transudate; cell count not taken. Specific gravity not taken. Removal of the fluid gave only a slight temporary relief from dyspnea.

December 24 (H. W. D.). Liver dulness to within 5 cm. below the costal border. No ascites made out. Pulsation over the liver (systolic) apparently expansile in type. Resonance improved over the left back. Pure bronchial breathing and whisper over both lobes (on the left).

(O'H.). Patient seemed more comfortable this evening. Chest tapped again and yielded 1200 cc, 130 cells per cu. mm. Very light trace of albumin. During the last of the time the needle was in the chest, and for about twenty minutes afterward, the patient had what seemed to be an anginal attack of pain in the left chest and down the left arm, relieved somewhat with nitroglycerine.

December 25 (O'H.). Chest tap again attempted; no fluid obtained this time.

December 26 (H. W. D.). Edema of the lungs on the right side, with tracheal rales. Heart has not moved to the left as the result of the removal of the fluid from the left pleura.

December 29 (O'H.). Although the patient was better for the past two days, subjectively, he says he does not feel quite so well

this morning. Dr. Larrabee's blood report is posted on December 26 on the laboratory sheet.

(H. W. D.). The left border of the heart is not percussible on account of dulness of the left chest. Right border 8 cm. from the midline. Sounds short, rapid, slightly irregular and of poor quality, with a friction-like sound accompanying the first sound just to the right of the sternum in the 5th-6th space. Left back dull, flat at base. Bronchial breathing and rales at both apices more marked on the left and diminishing in intensity, but not in character, as the left base is approached. There is doubtless still considerable fluid in the left back. Consolidation of the entire left lung apparently persists. Edema of the right lung for the past three days. Expiration now harsh over the right base.

January 2 (H. W. D.). Increase in degree of bronchial expiration of the right lung. Exquisite bronchial breathing over the entire left lung. No apparent fluid in the left base behind. Gallop rhythm over what appears to be the heart apex at the right nipple. Liver dulness extends 8 cm. below the costal margin. Liver slightly tender; no evidence of ascites. No edema of the legs.

January 3 (O'H.). Patient has now had 90 grains KI i. d. for a week, with no apparent improvement. This goes a long way toward ruling out gumma and makes aneurysm rather unlikely. Although the patient has been slightly better at times, he is taking a progressive downward course.

January 5 (O'H.). Patient has gone downhill rapidly in the past two days and died at an early hour this morning. Wassermann reported strongly positive.

Diagnosis: Mediastinal carcinoma. Obstruction of the superior vena cava.

BLOOD CHART.

December 26, Red corpuscles	3,000,000	Neutrophil polynuclears	87½ per cent.
White corpuscles	7,000	Eosinophils	½ "
Hemoglobin	60 per cent	Lymphocytes	4½ "
		Large lymphocytes	7½ "

No mast cells; no nucleated reds; platelets diminished much; reds show only slight changes.

Pathological Report. Autopsy, January 6, 1920, thirty hours post mortem. Body length, 170 cm. Age, twenty-nine years.

The body is that of a rather poorly developed and poorly nourished white male. Rigor mortis is present in moderate degree in all the skeletal muscles, and there is a deep lividity of the dependent portions and of the left side of the face and neck, with a light, blotchy lividity of the left side of the chest. The pupils are round, regular and equal, measuring 0.5 cm. in diameter. The face and neck are bloated, the chest large and the arms and legs thin and emaciated. There is marked edema of the left side of the scalp, face and the upper portions of the neck, of the outer portion of the

conjunctiva of the left eye and of both sides of the base of the neck and shoulders, with definite emphasis on the left side. The edema does not extend to the arms and is not found below the level of the second rib in front or below the spine of the scapula behind. There are several veins visible in the skin of the right side of the chest. Two particularly large trunks pass downward from the region of the right axilla and the right infraclavicular region respectively, joining at the level of the costal margin to form one large trunk

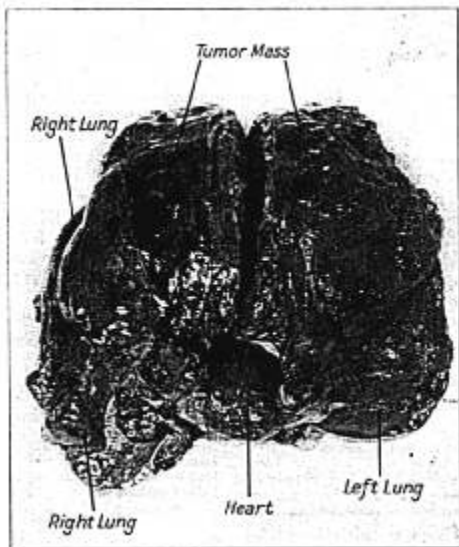


FIG. 2.—Thoracic organs removed entire. The tumor has been split in the center.

which continues downward to a point 2 cm. to the right of the symphysis pubis, where it disappears. In addition there are many areas in the skin of the chest on both sides where groups of smaller venous branches are enlarged and stand out conspicuously under the skin, these areas being more marked on the right than on the left. There is no caput medusæ.

Peritoneal Cavity: The subcutaneous fat is small in amount. There is moderate edema of the subpectoral spaces. The peritoneum is everywhere smooth and glistening. In the pelvis there

are about 50 cc of clear, yellowish fluid. The appendix, which measures 4 cm. in length, is firmly bound to the posterior abdominal wall in a retrocecal position, its tip pointing downward and outward. The omentum and mesentery contain little fat and the mesenteric lymph nodes stand out conspicuously, though they do not appear to be enlarged. The liver border extends 8 cm. below the costosternal angle in the midline, 5.5 cm. below the costal margin in the right nipple line. The diaphragm reaches to the level of the 5th rib on both sides.

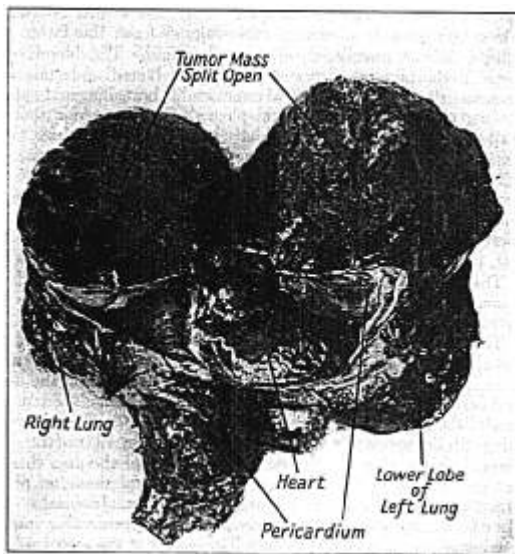


FIG. 3.—Tumor mass spread apart from the central cut, showing position of the heart.

Pleural Cavities: On removal of the sternum and ribs a large tumor mass is found occupying the anterior mediastinum, its anterior surface lying directly against the sternum and ribs. Its anterior aspect is roughly circular in shape, the center lying somewhat to the left of the median line. It extends in the median line from a point 1 cm. below the level of the top of the manubrium sterni to a point 19 cm. below, and laterally 5 cm. beyond the midline on the right, 12 cm. on the left. It covers the precordial area completely

and parts of the pulmonic areas, so that from the front only the lateral portions of the right lung and the lower lobe of the left lung can be seen. Its anterior surface is firm and coarsely nodular and grayish-white in color. Over the anterior surface of the left upper lobe the tumor has extended into the intercostal spaces and is firmly adherent to the periosteum of the second and third ribs. There is no erosion of the bone substance.

The left pleural cavity contains many friable, fibrinous adhesions throughout, most marked about the upper lobe and between the upper and lower lobes. By these adhesions the pleural cavity is divided into an upper and a lower cavity, the former containing 300 cc (estimated) of clear, amber-colored fluid, the latter containing 520 cc (measured) of a similar fluid. The bloodvessels beneath the parietal pleura are markedly dilated and stand out prominently as a fine network of innumerable branching and anastomosing trunks. In the parietal pleura of the posterior thoracic wall on the left there are five small circular areas of whitish tissue similar in appearance to the tumor tissue, the largest measuring 0.5 cm. in diameter. The right pleural cavity contains a few fibrinous adhesions anteriorly in the vicinity of the tumor and 1000 cc (measured) of clear yellow fluid. Its parietal surface presents a picture of vascular dilatation identical with that described on the left.

The heart is pushed downward, backward and to the left. On account of the presence of the tumor the pericardial cavity is not investigated *in situ*.

The thoracic organs are removed *en bloc*, the esophagus and great vessels being severed at the level of the diaphragm. The tumor mass is incised in the sagittal plane in the midline, revealing the heart and aorta lying against its posterior-inferior surface. The cut surface of the tumor thus disclosed is oval in shape, the long diameter lying parallel to the axis of the body and measuring 19 cm., the short diameter measuring 11 cm. At the periphery of the area there is an irregular zone of smooth, fairly firm, uniform tissue, in places 1 to 2 cm. in depth, in others barely perceptible. Internal to this there is a zone of soft, red or gray and red tissue representing varying degrees of necrosed tumor tissue. The center of the area is of the appearance and consistence of baked Indian pudding. The tumor mass as a whole is soft, fragile and extremely difficult to handle.

The tumor is removed from the adjacent normal structures by sharp dissection. The heart, aorta, right lung and lower lobe of the left lung are easily identified and separated. The growth of the tumor has displaced the pulmonary vessels downward and backward and has greatly lengthened the superior vena cava and innominate veins and the innominate, carotid and subclavian arteries. The upper lobe of the left lung is so extensively invaded that there is merely a narrow margin of the lung tissue on the posterior and

superior aspects. The vessels and bronchial branches here disappear into a mush of necrotic tumor tissue.

The superior vena cava is opened longitudinally and is found to contain a soft, friable, purple and pink thrombus running its entire length, the lower end of the thrombus projecting in the shape of a cone for a distance of a few millimeters into the right auricle. The thrombus extends for a short distance into the azygos vein and into the right innominate vein, runs up the left innominate vein as far as its bifurcation and continues up the left internal jugular vein as far as it can be reached in the neck. All the veins of the superior mediastinum, neck and shoulder regions are enormously distended and the tributaries of the subclavians running to the scapular and pectoral regions are especially conspicuous. The arteries, aside from their displacement, are not remarkable.

Pericardial Cavity: Contains about 15 cc of clear, yellow fluid.

Heart: Weight, 255 gm. The organ is small and rather flabby. Over the auriculoventricular and interventricular grooves there is a small deposit of pale fat. On opening the right auricle a thrombus is seen projecting for a short distance into its lumen from the superior vena cava as described above. The muscle on section is of a pale brown color. The endocardium and valves are not remarkable. The ascending portion of the aortic arch and the coronary vessels are free from sclerosis.

Measurements:

Tricuspid valve, 12.5 cm.

Pulmonary valve, 7. cm.

Mitral valve, 10.5 cm.

Aortic valve, 7 cm.

Left ventricle, 1.3 cm. in thickness.

Right ventricle, 0.4 cm. in thickness.

Lungs: The left upper lobe is extensively infiltrated with tumor tissue, which has replaced practically all the lung tissue. The lower lobe is gray-green in color, somewhat compressed, elastic and crepitant throughout on palpation. On section it is for the most part greenish-purple in color and translucent, with a smooth, elastic, rather dry surface from which but a small amount of frothy fluid can be expressed. The bronchioles are dilated and closely packed together. About some of the bronchioles in the outer portion of the lobe there are small, irregular, raised areas of reddish-gray, opaque, rather firm tissue. A few of the bronchial branches contain a small amount of mucopurulent secretion. The larger bronchi and vessels are not remarkable. The right lung is somewhat firmer and more nodular than the left. On section it presents a picture similar to that of the left lower lobe, with atelectasis, bronchiectases and scattered areas of partly organized bronchopneumonia. In addition it is edematous and congested, particularly in the upper lobe.

Spleen: Weight, 80 gm. The organ is small and firm. The capsule is thin and finely wrinkled throughout. On section it presents a smooth, fairly firm surface, reddish in color, in which the connective-tissue markings are rather prominent. A moderate amount of pulp scrapes away on the knife.

Gastro-intestinal Tract: Negative.

Pancreas: Negative.

Liver: Weight, 1590 gm. The organ is of average size and consistence. On the anterior-superior aspect of the right lobe a dome-shaped mass, 1.5 cm. in diameter, protrudes $\frac{1}{2}$ cm. above the surrounding surface. It is of fairly firm consistence and appears pale gray through the liver capsule. Section through the mass shows a round, unencapsulated and infiltrating area of smooth, fairly firm tissue, pale gray in color, save at the center, where there are a few irregular areas of reddish softening. A similar but somewhat smaller nodule occurs in the left lobe, and on section of the liver a third mass, the size of a large pea, is found embedded in the liver tissue 1.5 cm. below the capsule. The cut surface of the liver is red-brown in color, and in it the lobular markings stand out distinctly, the portal areas being dark red in color. The gall-bladder is thin-walled and contains about 20 cc of dark brown, viscid bile.

Kidneys: Weight, 350 gm. The organs are somewhat large, the consistence being normal. The capsule strips readily, leaving a smooth surface. On section the cut surface has a congested appearance. The markings are distinct, the cortex varying from 0.6 to 1 cm. in width and the glomeruli showing as red, translucent points. The pelves and ureters are not remarkable.

Adrenals: Negative.

Bladder: Negative.

Genital Organs: Negative.

Aorta: The surface is for the most part smooth, with but a few scattered areas of yellowish thickening. There is no calcification. The vessel stretches with considerable elasticity.

Anatomical Diagnoses: Malignant neoplasm of the mediastinum and the upper lobe of the left lung, with metastases to the pleura and to the liver. Thrombosis of the superior vena cava, the right and left innominate veins, the azygos vein and the left internal jugular vein, with establishment of a collateral circulation by the veins of the pleura and the skin of the chest and abdomen. Cachexia. Edema of all the tissues above the level of the junction of the second rib with the sternum. Bronchopneumonia of the right upper and lower and left lower lobes. Atelectasis. Bronchiectasis. Acute serofibrinous pleuritis, bilateral. Congestion of the kidneys. Slight arteriosclerosis.

Bacteriology: Heart's blood: Negative.

Right lung: Pneumococcus, Type II, and Staphylococcus aureus.

Left lung: Pneumococcus, Type II.

Right Bronchus: *Staphylococcus aureus*.

Left Bronchus: Contaminated.

Microscopic Examination: Postmortem changes throughout.

Heart: Negative.

Lung: Bronchopneumonia, with an exudate of polymorphonuclear leukocytes, a large proportion of endothelial leukocytes and small amounts of fibrin. A few diphtheroid organisms. Marked edema of the connective-tissue septa, with a small amount of inflammatory exudate. Organizing pleuritis. Two small foci of tumor tissue.

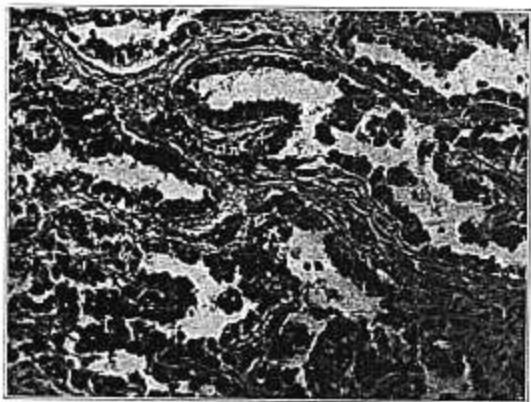


FIG. 4.—Section of tumor in the lung, showing gland-like cavities lined with cuboidal epithelium. The stroma is moderate in amount. $\times 200$.

Tumor I: A rapidly growing epithelial tumor, suggesting origin from the bronchial or the alveolar epithelium. The tumor cells are arranged in groups suggesting narrow tubes and walls of alveoli. They are single-layered and of rather irregular shape, and occur in groups bound by a loose edematous stroma with young, large cells. The tumor cells are cuboidal or cylindrical in shape and deep blue in color. The nucleus is round or oval with a fine chromatin network; the cytoplasm consists of fine blue reticulum. Mitotic figures occur frequently. Postmortem degeneration is marked. There are scattered areas of necrosis.

Tumor II: Same with a better nuclear stain.

Tumor III: Same. The alveolar structure is plainer. Mucous connective tissue, which in places is infiltrated with lymphocytes.

Superior Vena Cava I: The lumen contains a thrombus, partly of tumor tissue, partly of fibroblasts and fibrin. The vessel wall is edematous and the surrounding tissue consists of edematous connective tissue infiltrated with lymphocytes and endothelial leukocytes, resembling the mucous connective-tissue stroma of the tumor.

Superior Vena Cava II: Same. Only a few tumor cells in the lumen.

Superior Vena Cava III: Lumen entirely filled with thrombus. Organization of the periphery is fairly well advanced. Areas of invading loose connective tissue.

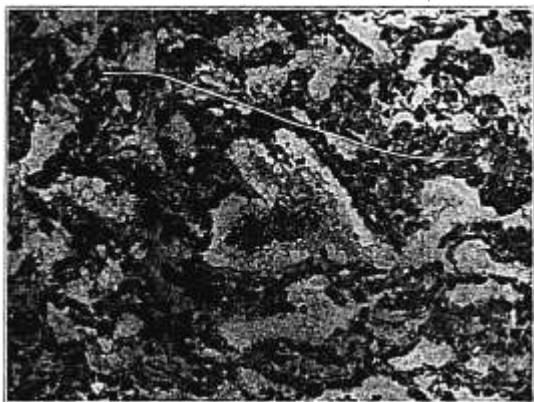


FIG. 5.—Section of metastasis in the liver. The lining epithelial cells are flatter in character, the stroma slighter. $\times 200$.

Vein: Smaller vessel. Picture same as superior vena cava III.

Spleen: Small amount of hyalin in the lymph follicles. Congestion.

Stomach: Thrombosis of a vein.

Intestine: Negative.

Pancreas: Negative.

Liver: Congestion and edema. A round area of tumor tissue is compressing the liver tissue into concentric rings of flattened cells. No fibrous capsule about the tumor. The tumor shows a similar picture to that described above.

Kidney: Congestion.

Adrenal: Dilated veins in medulla. Edema of surrounding connective tissue with atrophic fat.

Aorta: Few small atheromata.

Bone-marrow: Marked postmortem change.

Microscopic Diagnoses: Primary carcinoma of the lung with extension into the superior vena cava and metastasis to the liver. Thrombosis of the superior vena cava. Bronchopneumonia. Pulmonary edema. Organizing pleuritis. Congestion and hyalin changes in the spleen. Congestion and edema of the liver, kidneys and adrenals. Arteriosclerosis.

NOTE.—This is not a “joint article,” but a clinical paper, plus a pathological report. The pathologist never saw the clinical paper; he is not responsible for the opinions expressed therein, and since he never saw the patient during life, any clinical opinions must of necessity have been mine, except where noted as being O'Hara's. I have therefore retained the expression of “my” opinions.

H. W. D.

AN ENDOCRINAL FACTOR IN GENERAL PARESIS.

By THOMAS K. DAVIS, M.D.,

ADJUNCT ASSISTANT VISITING PHYSICIAN (NEUROLOGY) BELLEVUE HOSPITAL,
NEW YORK.

It has for many years puzzled psychiatrists why it is that of the great number of persons who are infected with syphilis only a few, probably less than 3 per cent of the total number, eventually develop general paresis. In seeking an answer to this question it is necessary to proceed along two natural lines. The first one is to show, if possible, that the difference rests in the spirochete—that there are strains of spirochete and that the ultimate development of general paresis in a patient depends upon infection with a certain syphilitic strain. The second is to seek out inherent peculiarities of the individual which would cause that individual to develop the paresis.

It is now generally acknowledged that general paresis follows in habitual quasi-constant fashion the syphilis of the benign initial type, and recognized that the likelihood of the development of general paresis in a case of syphilis is in inverse proportion to the occurrence of peripheral ectodermic reaction in the earlier course. The individual who after luetic infection does not show strong ectodermic lesions is more liable eventually to develop paresis. This clinical observation alone does not help to settle the question whether a special neurotropic strain of spirochete determines the paresis or whether the inherent constitutional condition of the individual determines it. The data which I have been able to bring together bear out the second phase of the question and show that the endocrinal